

Remarks

Applicants have read and considered the Office Action dated March 10, 2004 and the references cited therein. Claims 1 and 4 have now been amended and new claims 8-14 have been added to further distinguish over the cited references. Claims 6-7 have been withdrawn.

In the Action, the application was subject to a Restriction Requirement. A provisional election was made to prosecute the invention of Species I, claims 1-6. Applicants hereby affirm the election of Species I, claims 1-6, with traverse.

The specification was objected to because on page 11, lines 6 and 8, the reference numeral of chamber should be "22" and not "20". The specification has been amended to make this correction. Applicants assert that no new matter has been added.

Claims 1-2 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Copson* in view of *Gross et al.* The Action states that *Copson* shows a method of lyophilizing material comprising the steps of placing material to be processed in the chamber, creating a microwave field in the chamber, passing the water vapor through a condenser and stirring the microwave via a stirrer. *Copson* fails to teach the step of controlling the microwave power in response to temperature measurements in the chamber. The Action states that *Gross et al.* teach a product drying method of controlling microwave power in response to temperature measurements in the chamber. The Action states that it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the method of *Copson* with the step of controlling the microwave power in response to the drying chamber temperature in order to improve the drying efficiency. Applicants respectfully traverse the rejection.

Applicants assert that the method of the present invention provides advantages over the prior art or any combination thereof and patentably distinguishes over the prior art.

Claim 1 recites that the materials placed in the chamber under varying temperature and pressure conditions to facilitate lyophilization. Moreover, temperature measurements are taken to detect corona discharges and the microwave power is coordinated in response to the detected

corona discharges. None of the prior art references teach or suggest such a combination for coordinating all the various conditions to arrive at an optimal process. The present invention provides a chamber and varying pressure and temperature conditions along with varying microwave power and duration. These variables in combination allow for optimization of the lyophilization process. The method of the present invention detects corona discharges to adjust the microwave field strength. Not only is the power variable, but the duration of the waves being generated is also variable in response to the sensing of corona discharges. This is neither shown nor suggested by the prior art references or any combination thereof. Applicants assert that claim 1 distinguishes over the prior art.

Moreover, claim 4 recites that the microwaves in the field are stirred with a stirrer having arc inhibiting surfaces to assist and improve microwave dispersion in the chamber. The prior art neither teaches nor suggests using such a device in such a method. The use of a microwave stirrer with arc inhibiting surfaces in combination with the other steps is neither shown nor suggested by the prior art. Applicants assert that claim 4 is also allowable. Applicants assert that claims 1, 2 and 4 overcome the rejections.

Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Copson* in view of *Gross et al.* and further in view of *Takahashi*. The Office Action states that the method is shown in *Copson* except for the step of shielding selected surfaces from direct exposure to microwaves. However, the action states that *Takahashi* teaches a method with a step of shielding the selected surfaces in the chamber from direct exposure to microwaves and that it would have been obvious to combine the references to arrive at the presently claimed invention. Applicants assert that claim 1 is allowable for the reasons stated above and that *Takahashi* neither teaches nor suggests the recited steps. Applicants assert that claim 5 is also allowable.

Claim 3 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants thank the Examiner for the indication of allowable subject matter. New claim 9 incorporates the features of claim 3 and the base claim. Applicants assert that new claim 9 is therefore allowable.

New claim 8 recites that the chamber includes a sensor taking temperature measurements with arc inhibiting surfaces and a stirrer with arc inhibiting surfaces. As stated above, the prior art fails to teach or suggest the use of such arc inhibiting surfaces and in particular, does not teach or suggest the use of a sensor with arc inhibiting surfaces or stirrer with arc inhibiting surfaces. Sensors and stirrers are placed into the microwave field and the use of arc inhibiting surfaces greatly reduces the occurrences of corona discharge, thereby greatly improving the lyophilization process and the quality of the material processed. Applicants assert that claim 8 is in condition for allowance.

New claim 10 recites a method of lyophilizing material comprising the steps of placing the material to be processed in a chamber and varying temperature and pressure conditions to facilitate lyophilization and creating a microwave field in the chamber and stirring the microwave field. Claim 10 further recites sensing corona discharges in the chamber controlling microwave power and duration to vary microwave field strength in response to sensed corona discharges and trapping the water vapor extracted from the material being dried. Applicants assert that such a method is neither shown nor suggested by the cited references or any combination thereof. As stated above, the references do not teach varying of the temperature and pressure conditions along with sensing the corona discharges and controlling microwave power and duration of varying microwave field strength in response to the sensed corona discharges. Moreover, the prior art fails to arrive at such controlled processing with stirring of microwaves improving microwave penetration throughout the chamber. Applicants assert that claim 10 is allowable for these reasons as well as those stated above.

New claim 11 recites shielding selected surfaces in the chamber from direct exposure to microwaves. Applicants assert that claim 11 is allowable for these advantages as well as those stated above with regard to claim 10.

Claim 12 recites providing selected surfaces in the chamber with arc inhibiting surfaces. None of the prior art teaches or suggests providing such arc inhibiting surfaces. Applicants assert that claim 12 is allowable for these reasons. In addition, claim 13 recites that the stirrer is provided with arc inhibiting surfaces. Moreover, it can be seen that providing arc inhibiting

surfaces of the stirrer with moving parts greatly reduces the occurrence of corona discharges. Such a method improves efficiency of lyophilization and the quality of the material being processed. Applicants assert that none of the prior art teach or suggest using a method with these steps.

Claim 14 recites shielding selected surfaces of the chamber from direct exposure. The shielding of surfaces and use of arc inhibiting surfaces on a stirrer is neither shown nor suggested by the prior art. Applicants assert that the method of claim 14 patentably distinguishes over the prior art.

A speedy and favorable action on the merits is hereby solicited. If the Examiner feels that a telephone interview may be helpful in this matter, please contact Applicant's representative at (612) 336-4728.

Respectfully submitted,

MERCHANT & GOULD P.C.

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By: _____



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